

AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (CURRENTLY AMENDED) A system for collecting biological information on a dyed biological particle by irradiating light onto liquid containing the dyed biological particles and detecting information light therefrom, the system comprising:

a path-defining structure of transparent material defining a flow path through which the liquid containing the dyed biological particles runs;

an irradiation apparatus for irradiating light onto the particles passing through the flow path;

a first detecting apparatus for detecting first information light obtained from the irradiated particle; [[and]]

a second detecting apparatus for detecting second information light obtained from the irradiated particle;

wherein at least one of said first and second detecting apparatuses includes one or more fiber optics, of which one ends are arranged adjacent the flow path so as to collect the information light;

a cylindrical container having a laminar-flow generating chamber provided upstream the flow path;

a sheath-fluid line for supplying sheath fluid constituting a main body of the liquid from an upper end of the cylindrical container;

a suspension-fluid tube arranged along the central axis of the cylindrical container for supplying suspension fluid containing the particles into the sheath fluid running within the laminar-flow generating chamber;
and

a mechanism for adjusting at least one of a position and an angle of a suspension-fluid outlet of the suspension-fluid tube.

2. (PREVIOUSLY PRESENTED) The system according to Claim 1,
wherein the flow path defined by said path-defining structure has a rectangular cross section defined by a pair of first walls and a pair of second walls perpendicular to the first walls;

wherein said irradiation apparatus emits light to one of the first walls;
wherein said first detecting apparatus detects light transmitting through another one of the first walls; and

wherein said second detecting apparatus detects light transmitting through one of the second walls.

3. (PREVIOUSLY PRESENTED) The system according to Claim 2,
wherein one ends of the fiber optics are arranged substantially in parallel to one of the second walls.

4. (CURRENTLY AMENDED) A system for collecting biological information on a dyed biological particle by irradiating light onto liquid containing the dyed biological particles and detecting information light therefrom, the system comprising: ~~The system according to Claim 2,~~
a path-defining structure of transparent material defining a flow path through which the liquid containing the dyed biological particles runs;
an irradiation apparatus for irradiating light onto the particles passing through the flow path;
a first detecting apparatus for detecting first information light obtained from the irradiated particle; and
a second detecting apparatus for detecting second information light obtained from the irradiated particle;
wherein at least one of said first and second detecting apparatuses includes one or more fiber optics, of which one ends are arranged adjacent the flow path so as to collect the information light;
wherein the flow path defined by said path-defining structure has a rectangular cross section defined by a pair of first walls and a pair of second walls perpendicular to the first walls;
wherein said irradiation apparatus emits light to one of the first walls;
wherein said first detecting apparatus detects light transmitting through another one of the first walls;

wherein said second detecting apparatus detects light transmitting through one of the second walls;

wherein said path-defining structure includes a partition plate between one ends of the fiber optics and one of the walls opposing to one ends of the fiber optics; and

wherein one ends of the fiber optics opposes to the partition plate.

5. (PREVIOUSLY PRESENTED) The system according to Claim 4, wherein a gap between one ends of the fiber optics and the partition plate is filled up with transparent filler material.

6. (PREVIOUSLY PRESENTED) The system according to Claim 4, wherein a gap between one ends of the fiber optics and the partition plate is filled up with transparent filler material having refraction index that is substantially intermediate between ones of the fiber optics and the partition plate.

7. (PREVIOUSLY PRESENTED) The system according to Claim 2, wherein the flow path having the rectangular cross section is designed such that light diffused and scattered at the corner portions formed at intersections of the first walls and the second walls are prevented from entering into fiber optics.

8. (PREVIOUSLY PRESENTED) A system for collecting biological information on a dyed biological particle by irradiating light onto liquid containing the dyed biological particles and detecting information light therefrom, the system comprising:

a path-defining structure of transparent material for defining a flow path through which liquid containing the dyed biological particles runs;

an irradiation apparatus for irradiating light onto the particles passing through the flow path;

a first detecting apparatus for detecting first information light obtained from the irradiated particle; and

a second detecting apparatus for detecting second information light obtained from the irradiated particle;

wherein said irradiation apparatus includes first optical elements for collecting light at a first position and second optical elements for collecting light at a second position, the first and second positions being spaced from each other by a predetermined distance along a central axis of the flow path;

wherein at least one of said first and second detecting apparatuses includes first and second fiber optics, of which one ends are arranged adjacent the flow path so as to collect the information light from the particles irradiated at the first and second positions.

9. (PREVIOUSLY PRESENTED) The system according to Claim 8, wherein the first and second positions are determined such that the emitted/scattered light from the particle at the first position is prevented from entering into the second fiber optics, and the scattered light from the particle at the second position is prevented from entering into the first fiber optics.

10. (PREVIOUSLY PRESENTED) The system according to Claim 8, wherein a fiber bundle is formed by a central fiber optics and six fiber optics that are closely arranged around the central fiber optics; and wherein two of the fiber optics of the fiber bundle are selectively used as the first and second fiber optics.

11. (PREVIOUSLY PRESENTED) The system according to Claim 1, said path-defining structure including:
a first transparent member having at least one planar surface;
a second transparent member having a pair of opposing planar surfaces in parallel to each other, one of the surfaces opposing to the first transparent member and being spaced from the first transparent member by a predetermined distance; and
a pair of third transparent members sandwiched between the planar surface of the first transparent member and one of the surfaces opposing to

the first transparent member, the pair of the third transparent members being spaced from each other by a predetermined distance, so as to define the rectangular flow path in conjunction with the first and second transparent members.

12. (PREVIOUSLY PRESENTED) The system according to Claim 11, wherein said path-defining structure further includes a fourth member opposing to another one of the surfaces of the second member, for holding a fiber block therein, which supports one ends of the first and second fiber optics.

13. (PREVIOUSLY PRESENTED) The system according to Claim 1, wherein at least one of said first and second detecting apparatuses includes a fiber connector at another end of the first and second fiber optics; and

wherein a collimating lens is provided within the fiber optics for collimating light that has been transmitted through the fiber optics.

14. (PREVIOUSLY PRESENTED) The system according to Claim 1, wherein at least one of said first and second detecting apparatus includes a spectrometer for splitting light components from light received by

the fiber optics, and a plurality of optical detectors for reading information within the light split by the spectrometer.

15. (CURRENTLY AMENDED) A system for collecting biological information on a dyed biological particle by irradiating light onto liquid containing the dyed biological particles and detecting information light therefrom, the system comprising: ~~The system according to Claim 14,~~
a path-defining structure of transparent material defining a flow path through which the liquid containing the dyed biological particles runs;
an irradiation apparatus for irradiating light onto the particles passing through the flow path;
a first detecting apparatus for detecting first information light obtained from the irradiated particle;
a second detecting apparatus for detecting second information light obtained from the irradiated particle;
wherein at least one of said first and second detecting apparatuses includes one or more fiber optics, of which one ends are arranged adjacent the flow path so as to collect the information light;
wherein at least one of said first and second detecting apparatus includes a spectrometer for splitting light components from light received by the fiber optics, and a plurality of optical detectors for reading information within the light split by the spectrometer;

~~further including a signal processing apparatus;~~ ~~said signal processing apparatus, including:~~

wherein the signal processing apparatus includes an A/W/H circuitry
for calculating an area, width, and height of a plurality of analog signals
output from a plurality of the optical detectors₁[[;]]

an A/D converter for converting analog signals output from the
A/W/H circuitry into digital signals₁[[;]]

a first-in first-out memory for storing digital information based upon
digital signals output the A/D converter and for simultaneously outputting a
plurality of digital information₁[[;]]

a compensation circuitry for compensating digital signals output from
the memory₁[[;]] and

a logarithmic calculator for logarithmically calculating digital
information output from the compensation circuitry.

16. (CANCELLED)

17. (CURRENTLY AMENDED) A system for collecting biological
information on a dyed biological particle by irradiating light onto liquid
containing the dyed biological particles and detecting information light
therefrom, the system comprising: ~~The system according to Claim 1, further~~
~~including:~~

a path-defining structure of transparent material defining a flow path through which the liquid containing the dyed biological particles runs;

an irradiation apparatus for irradiating light onto the particles passing through the flow path;

a first detecting apparatus for detecting first information light obtained from the irradiated particle;

a second detecting apparatus for detecting second information light obtained from the irradiated particle;

wherein at least one of said first and second detecting apparatuses includes one or more fiber optics, of which one ends are arranged adjacent the flow path so as to collect the information light;

a cylindrical container having a laminar-flow generating chamber provided upstream the flow path;

a sheath-fluid line for supplying sheath fluid constituting a main body of the liquid from an upper end of the cylindrical container;

a suspension-fluid tube arranged along the central axis of the cylindrical container for supplying suspension fluid containing the particles into the sheath fluid running within the laminar-flow generating chamber;

a mechanism for adjusting a position of a suspension-fluid outlet of the suspension-fluid tube; and

a drain line connected with a lower end of the laminar-flow generating chamber;

a sheath-fluid source of the sheath fluid;
a sheath-fluid waste of the sheath fluid;
means for selectively connecting the drain line with either one of the
sheath-fluid source and the sheath-fluid waste.

18. (PREVIOUSLY PRESENTED) The system according to Claim 1,
further including:

means for imparting oscillation on the liquid in a direction
perpendicular to the fluid flow.

19. (PREVIOUSLY PRESENTED) The system according to Claim 1,
further including:

means for imparting oscillation on the liquid in a direction along the
fluid flow.

20. (CURRENTLY AMENDED) A system for collecting biological
information on a dyed biological particle by irradiating light onto liquid
containing the dyed biological particles and detecting information light
therefrom, the system comprising: ~~The system according to Claim 1, further
including:~~

a path-defining structure of transparent material defining a flow path
through which the liquid containing the dyed biological particles runs;

an irradiation apparatus for irradiating light onto the particles passing through the flow path;

a first detecting apparatus for detecting first information light obtained from the irradiated particle;

a second detecting apparatus for detecting second information light obtained from the irradiated particle;

wherein at least one of said first and second detecting apparatuses includes one or more fiber optics, of which one ends are arranged adjacent the flow path so as to collect the information light;

charging means for charging a droplet injected from the flow path;

a pair of deflecting plates provided adjacent a dropping path of the charged droplet; and

a power source circuitry for generating an electrical field between a pair of the deflecting plates;

wherein at least one of the deflecting plates is formed from a porous plate, and an aspirator being provided at rear end of the porous deflecting plate for aspirating droplet attached on the porous deflecting plate.